

Attachment 1: Description of Emissions Reduction Measure Form

Please fill out one form for each emission reduction measure. See instructions on attachment 2.

Title: Emission Reductions from improved urban water use efficiency

Type of Measure (check all that apply):

- | | |
|--|--|
| <input checked="" type="checkbox"/> Direct regulation | <input checked="" type="checkbox"/> Market-based compliance: |
| <input checked="" type="checkbox"/> Monetary Incentive | <input type="checkbox"/> Non-monetary incentive |
| <input checked="" type="checkbox"/> Voluntary | <input type="checkbox"/> Alternative Compliance Mechanism |
| <input type="checkbox"/> Other Describe: | |

Responsible Agency: California Department of Water Resources

Sector:

- | | |
|---|---|
| <input type="checkbox"/> Transportation | <input type="checkbox"/> Electricity Generation |
| <input type="checkbox"/> Other Industrial | <input type="checkbox"/> Refineries |
| <input type="checkbox"/> Agriculture | <input type="checkbox"/> Cement |
| <input type="checkbox"/> Sequestration | <input checked="" type="checkbox"/> Other Describe: Water |

2020 Baseline Emissions assumed (MMT CO₂ eq): 21.7

Note: Urban water sector only. Based on DWR projection of 12 MAF/year (bulletin 160-98), CEC average estimate of 9220 kWh/million gallons (California's Water- Energy Relationship, 2005), and EIA emissions estimate for natural gas-fired plants of 1.321 lbs CO₂ per kWh.

Percent reduction in 2020: 25.8%

Assumes 3.1 MAF/year, the upper end of DWR's estimate for urban water conservation (Bulletin 160-2005). As above assumes, CEC average estimate of 9220 kWh/million gallons , and EIA emissions estimate for natural gas-fired plants of 1.321 lbs CO₂ per kWh.

Pacific Institute reports higher potential for cost-effective water conservation than DWR.

Cost effectiveness (\$/metric ton CO₂E) in 2020: \$211 per ton

Assumes DWR average price of \$380/af for urban conservation. Note that the price provides water supply without diversions from the natural environment. So urban water provides a triple benefit - CO₂ reduction, aquatic ecosystems benefit and water supply.

Description: Improved Water Use Efficiency

Providing necessary water supplies to California's farms and cities requires significant use of energy and thus contributes to global warming. According to a 2005 California Energy Commission Report, water use accounts for about 20% of all electricity demand within the state. Finding ways to use water more efficiently has the potential to decrease electricity use and thus the greenhouse gas emissions that are emitted from coal and natural gas-fired power plants.

Reducing water use will provide substantial benefits to our aquatic ecosystems as well. A careful, systematic approach to increasing water use efficiency will not only help meet California's greenhouse gas targets, it will also help to prevent further damage to aquatic ecosystems and enable many restoration efforts to proceed.

Water use efficiency improvements should be pursued throughout the State. The most obvious intensive use of energy in providing water supply is that required to pump water exported from the Delta over the Tehachapi Mountains, mostly for urban use, to southern California. While the agricultural sector uses less energy, both per acre-foot and overall, than the urban sector, it does use 80% of the water consumed in the State so energy savings from increased efficiency in the agricultural sector should be pursued as well.

Description: Including Water in the Cap and Trade Program

It is anticipated that the majority of the electricity required to pump, convey, treat and deliver water in the State is provided by generators that will be regulated entities under a cap and trade program and therefore the water sector should not be separately under a cap and trade.

A variety of mechanisms outside the cap and trade system will provide guidance to water agencies as they facilitate more efficient use, helping to reduce greenhouse gas emissions and provide ancillary benefits as well. These approaches are well-known; the challenge is how to encourage or require broad adoption among the hundreds of water agencies in California.

Description: Direct Regulation / Monetary Incentive

Opportunities for improving water use efficiency in the urban sector are well documented. The most recent California Water Plan (2005) anticipates that increased water use efficiency in the urban sector will meet up to 3.1 million acre-feet of demand.

Given the combined benefits to ecosystem and greenhouse gas objectives, Environmental Defense recommends that the California Air Resources Board adopt policies that encourage aggressive measures to improve water use efficiency while ensuring that reliable water supplies are available to meet the needs of urban and agricultural communities.

We believe CARB should explore both means to directly regulate improved efficiency measures by requiring that water agencies implement certain measures and to encourage water agencies to adopt those measures by making implementation of those measures a condition of receiving State bond dollars or other funds. Together CARB and DWR should establish a water use efficiency performance standard for urban agencies, and use the standard as a means by which to encourage efficient use.

Description: Market-Based Water Efficiency Measures Outside the Cap and Trade Program

Urban Water Rate Structures – Rate structures for urban water and wastewater often do not send appropriate price signals to consumers and thus contribute to excessive use. While many of the fixed rates associated with Central Valley towns (i.e. monthly bills that are independent of volume of water consumed) are being phased out, most urban agencies still include a fixed charge as well as a volumetric charge. Many agencies have rate structures that are “tiered” (i.e. customers pay higher incremental amounts if they use large volumes of water), but these tiered rates are often dominated by high fixed costs.

Rate structures that depend little on fixed charges and as much as possible on marginal costs would encourage the conservation of both energy and water. These rates would also be more socially just, as customers who use very small amounts of water would not be burdened with an unfairly high fixed charge.

CARB should be aware that water agencies are very sensitive to proposed changes in rate structure. Board members must defend their policies at public meetings in which customers who use the highest volumes attend to protest their bills in loud voices. Sensible rate structure policies set forth by CARB would provide water agencies cover as they eliminate imbedded historical inefficiencies and implement more progressive policies. Other water agency concerns include the necessity to stabilize revenue or to garner favor with bond rating companies. These concerns can and should be addressed.

Eliminate disincentives encouraged by subsidies and below market energy and water rates – In many areas of California, below market costs of energy and water encourage overuse. Subsidies have been an integral part of most federal projects, including the Central Valley Project and the Colorado River Storage Project that provide significant portions of California’s water supply. These subsidies are rooted in policy initiated more than a century ago when the majority of Americans lived on farms. Today’s farms are very different from those of 100 years ago and largely dependent on mechanized labor, but imbedded subsidies continue to provide incentives for excessive use.

Beyond these obvious subsidies, most water in California is locally controlled. While it is often sold at \$10 per acre-foot or less within water rich communities, water-poor communities often must pay hundreds of dollars for an acre-foot. If water were more appropriately priced to reflect the ecological cost, including the carbon cost as well ecosystem costs, the market would result in a more efficient use of the resource.

The hydropower associated with water projects generates clean, renewable energy. While dams do harm to aquatic environments, they simultaneously provide benefits by offsetting greenhouse gas emissions from coal- and gas-fired plants. Hydropower is often sold at rates that are far below market, discouraging energy conservation efforts. Certainly this is the case with federal hydropower, much of which is used for project use (i.e. water pumping) or sold to public utilities throughout the state. There are other examples as well, however, such as public schools in San Francisco that receive low cost hydropower from the Hetch Hetchy project and thus have no incentive to install efficient lighting or other electric system improvements.

Environmental Defense believes that addressing the inefficiencies caused by sales of water or electric power sold at below-market rates has the potential to provide significant greenhouse gas reductions. In some cases, the current beneficiaries perhaps should not be entitled to purchase water or power at a below-market cost. In other cases, policies could be developed that encourage other parties to invest in improved efficiencies and receive the benefits. We believe that CARB has the authority, indeed the mandate, to broadly seek out and eliminate impediments to efficient use not only of energy but of water as well.

Emission reduction calculations and assumptions:

Amount	Units	Source
3.1	MAF/Year	California Water Plan (2005)
3,100,000	af/year	Calculation
9,220	kWh/mg	CEC page 126
326,000	gallons per acre-foot	Conversion factor
3,006	kWh/af	Calculation
1.321	lbs/kWh	EIA value for natural gas
9,317,732,000	kWh/year	Calculation
12,308,723,972	lbs/year	Calculation
5,594,875	Metric Tons/year	Calculation
5.6	M Metric Tons per Year	Calculation

Cost effectiveness calculation and assumptions:

Amount	Units	Source
380	\$/af	DWR average value
1,178,000,000	\$/year	Calculation
211	\$ per metric Ton	Calculation

Implementation Barriers and Ways to Overcome Them: None observed

Potential Impact on Criteria and Toxic Pollutants:

Emissions from combustion of fossil fuels to generate power for the purpose of water movement can lead to formation of nitrogen oxides and carbon monoxide. Generally, as combustion rates are decreased, the formation rate of these pollutants also decreases.

Name: Spreck Rosekrans

Organization: Environmental Defense

Phone/e-mail: 510 658 8008 - spreck@edf.org